

CLAIMS

What is claimed is:

1. A programmable access device for use in a network access system, said programmable access device comprising:

first and second network interfaces through which packets are communicated with a network;

a packet header filter and a forwarding table, wherein the forwarding table is utilized to forward packets between the first and second network interfaces, and wherein said packet header filter identifies messages received at one of the first and second network interfaces on which policy-based services are to be implemented and passes identified messages via a message interface to an external processor for processing.

2. The programmable access device of Claim 1, wherein the packet header filter receives packets directly from the first network interface.

3. The programmable access device of Claim 2, wherein the packet header filter is a first packet header filter, and wherein the programmable access device further comprises a second packet header filter that receives packets directly from the second network interface.

4. The programmable access device of Claim 1, wherein the packet header filter filters packets for service processing based upon protocol information pertaining to protocol layers higher than layer 3.

1 12. The programmable access device of Claim 1, and further comprising
2 one or more output buffers for outgoing packets.

1 13. The programmable access device of Claim 12, and further comprising a
2 scheduler associated with the one or more output buffers that schedules the
3 transmission of outgoing packets within the one or more output buffers.

1 14. The programmable access device of Claim 13, wherein the scheduler
2 supports multiple quality of service classes.

1 15. The programmable access device of Claim 1, and further comprising a
2 control interface through which said packet header filter and said forwarding
3 table are programmed.

1 16. The programmable access device of Claim 15, and further comprising
2 at least a programmable monitor that monitors at least one programmed traffic
3 type.

1 17. The programmable access device of Claim 15, and further comprising a
2 policer that polices packets by reference to programmed traffic parameters.

1 18. The programmable access device of Claim 15, and further comprising
2 one or more output buffers for outgoing packets and an associated scheduler
3 that transmits the outgoing packets from the one or more output buffers
4 through the second network interface according to a programmed
5 methodology.

- 1 19. The programmable access device of Claim 1, wherein the identified
2 message is a session initiation protocol (SIP) message.
- 1 20. The programmable access device of Claim 1, wherein the identified
2 message is an Internet Group Multicast Protocol (IGMP) message.
- 1 21. The programmable access device of Claim 1, wherein the identified
2 message is a Resource Reservation Protocol (RSVP) message.
- 1 22. The programmable access device of Claim 1, and further comprising a
2 plurality of protocol-specific state machines for a respective plurality of
3 protocol types.
- 1 23. The programmable access device of Claim 1, wherein said plurality of
2 protocol-specific state machines include a transport control protocol (TCP)
3 state machine that, responsive to a control command, provides preferential
4 treatment to a particular TCP session.
- 1 24. The programmable access device of Claim 1, and further comprising a
2 reporting interface through which the programmable access device reports
3 state information for active sessions to an external processor.
- 1 25. The programmable access device of Claim 24, wherein the reporting
2 interface reports the state information for an active session in response to

3 allocation of service to a new external service controller.

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2 26. A method of packet handling in a programmable access device of a
network access system, said method comprising:

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4 in response to receiving a series of packet at a first network interface of a
5 programmable access device, filtering the series of packets at the programmable
6 access device to identify messages upon which policy-based services are to be
7 implemented;

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9 passing identified messages to an external processor for service processing;
10 and

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12 for messages that are not identified, routing packets by reference to a
13 forwarding table in the programmable access device and outputting the routed
14 packets at a second network interface of the programmable access device.

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2 27. The method of Claim 26, and further comprising receives packets at the
packet header filter directly from the first network interface.

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2 28. The method of Claim 27, wherein the packet header filter is a first
3 packet header filter, said method further comprising receiving packets at a
4 second packet header filter of the programmable access device directly from
the second network interface.

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2 29. The method of Claim 26, wherein filtering comprises filtering packets
3 for service processing based upon protocol information pertaining to protocol
layers higher than layer 3.

1 30. The method of Claim 26, and further comprising policing packets by
2 reference to traffic parameters utilizing a policer in the programmable access
3 device.

1 31. The method of Claim 30, wherein policing comprises marking packets
2 that do not conform with the traffic parameters.

1 32. The method of Claim 26, wherein the programmable access device
2 includes at least a usage monitor, said method further comprising monitors at
3 least one traffic type in said series of packets.

1 33. The method of Claim 32, wherein the usage monitor has an associated
2 threshold, said method further comprising generating a reporting event for the
3 usage monitor when the threshold is exceeded.

1 34. The method of Claim 33, and further comprising communicating the
2 reporting event to an external processor via a reporting interface.

1 35. The method of Claim 34, wherein generating a reporting event
2 comprises generating a reporting event in response to a session activity level
3 threshold.

1 36. The method of Claim 32, and further comprising monitoring faults
2 utilizing a fault monitor in said programmable access device.

1 37. The method of Claim 26, and further comprising buffering outgoing
2 packets in one or more output buffers in said programmable access device.

1 38. The method of Claim 37, and further comprising scheduling the
2 transmission of outgoing packets within the one or more output buffers to
3 support multiple quality of service classes.

1 39. The method of Claim 26, and further comprising programming said
2 programmable access device through a control interface of said programmable
3 access device.

1 40. The method of Claim 39, wherein the programmable access device
2 further includes at least one programmable monitor, said method further
3 comprising monitoring at least one programmed traffic type utilizing said at
4 least one programmable monitor.

1 41. The method of Claim 39, wherein said programmable access device
2 includes a policer, said method further comprising policing packets by
3 reference to programmed traffic parameters.

1 42. The method of Claim 39, wherein the programmable access device
2 includes one or more output buffers for outgoing packets and an associated
3 scheduler, said method comprising transmitting the outgoing packets from the
4 one or more output buffers through the second network interface according to a
5 programmed methodology.

1 43. The method of Claim 26, wherein the identified message is a session
2 initiation protocol (SIP) message.

1 44. The method of Claim 26, wherein the identified message is an Internet
2 Group Multicast Protocol (IGMP) message.

1 45. The method of Claim 26, wherein the identified message is a Resource
2 Reservation Protocol (RSVP) message.

1 46. The method of Claim 26, and further comprising maintaining in said
2 programmable access device a plurality of protocol-specific state machines for
3 a respective plurality of protocol types.

1 47. The method of Claim 26, wherein said plurality of protocol-specific
2 state machines include a transport control protocol (TCP) state machine, and
3 wherein the method further comprises providing preferential treatment to a
4 particular TCP session by said programmable access device in response to a
5 command.

1 48. The method of Claim 26, and further comprising reporting state
2 information for active sessions to an external processor via a reporting
3 interface of the programmable access device.

1 49. The method of Claim 48, wherein reporting comprises reporting the state
2 information for an active session in response to allocation of service to a new

3 external service controller.